Claims

[c1] What is claimed is:

1. A method for detecting a periodic signal in a communication system, the method comprising:

(a) converting a time domain digitized signal to obtain a corresponding frequency domain digitized signal;

(b) quantizing at least two symbols of the frequency domain digitized signal to obtain quantization information; and

(c) utilizing the quantization information to compute a detection metric for periodic signal detection.

[c2] 2. The method of claim 1 wherein computing the detection metric comprises utilizing a sum of weighted sign correlations of real parts and imaginary parts of the quantization information.

[c3] 3. The method of claim 1 further comprising determining that a periodic signal is detected if the detection metric is greater than a predetermined threshold.

[c4] 4. The method of claim 1 wherein the symbols are consecutive symbols.

5. The method of claim 4 wherein computing the detection metric comprises utilizing a sum of weighted sign correlations of real parts and imaginary parts of the first two of three consecutive symbols in the quantization information as a first detection metric, and utilizingreal parts and imaginary parts of the last two of the three consecutive symbols in the quantization information as a second detection metric; wherein the periodic signal is determined to be detected if the first detection metric is greater than a first positive threshold and the second detection metric is greater than a second positive threshold, the first positive threshold being smaller than or equal to the second positive threshold.

6. The method in claim 5 further comprising:
(a) determining that the periodic signal is not detected when the first detection metric is not greater than the first positive threshold;
(b) determining that the periodic signal is possibly detected when the first detection metric is greater than the first positive threshold and the second detection metric is not yet computed;
(c) determining that the periodic signal is not detected when the first detection metric is greater than the first positive threshold and the second detection metric is not greater than the second positive threshold;

(d) initiating computing of another first detection metric when the periodic signal is determined to be not detected; and

(e) performing receiver training when the periodic signal is determined to be detected or possibly detected, and halting receiver training when the periodic signal is determined to be not detected.

[c7] 7. A periodic signal detection systemfor an orthogonal frequency division multiplexing (OFDM) or a discrete multi-tone (DMT) communication system, the signal detection system comprising:

a serial-to-parallel converter capable of performing serial-to-parallel conversion on an input time domain digital signal;

a fast Fourier transform (FFT)moduleelectrically connected to the serial-to-parallel converter for transforming the time domain digital signal to a frequency domain digital signal; and

a demodulator electrically connected to the FFT module comprising:

a periodic signal detector comprising:

a quantizer electrically connected to the FFT module for quantizing symbols of the frequency domain digital signal of the FFT module;

a sign correlator electrically connected to the quantizer

for performing a predetermined correlation to generate a detection metric for periodic signal detection; and

a sign memory electrically connected to the quantizer and the sign correlator for providing sign information obtained from the quantizer to the sign correlator; and

a demodulation module for demodulating the frequency domain digital signal.

[c8] 8. The periodic signal detection system of claim 7 further comprising a comparator for comparing the detection metric with at least one predetermined threshold.

[c9] 9. The periodic signal detection system in claim 7 wherein the signal correlator is capable of generating a sum of weighted sign correlations of real parts and imaginary parts of two consecutive outputs of the quantizer to provide the detection metric for periodic signal detection.